TM 11-6940-201-10

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR'S MANUAL
OSCILLATORS VO-3-D, VO-3-E, AND VO-3-F

HEADQUARTERS, DEPARTMENT OF THE ARMY
SEPTEMBER 1958

WARNING

EXTREMELY DANGEROUS VOLTAGES ARE

PRESENT IN THIS EQUIPMENT

SERIOUS INJURY OR DEATH

may result if

safety precautions

are not observed.

TM 11-6940-201-10
*C 3

TECHNICAL MANUAL
Operator's Manual
OSCILLATORS VO-3-D, VO-3-E, AND VO-3-F

TM 11-6940-201-10
CHANGE No. 3

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *30 August 1963*

TM 11-6940-201-10, 17 September 1958, is changed as follows:

Note. The parenthetical reference to a previous change (example: "page 1 of C 1") indicates that pertinent material was published in that change.

(As changed by C 1, 9 May 60) Manual also applies to the following equipment:

Nomenclature	*Order No.*
Oscillator VO-3-F	7171-PP-59

Page 2, paragraph 1. Delete subparagraph *e*.

After paragraph 1, add paragraph 1.1.

1.1. Index of Publications

Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to this equipment. DA Pam 310-4 is a current index of technical manuals technical bulletins, supply bulletins, lubrication orders, and modification work orders that are available through publications supply channels. The index lists the individual parts (-10, -20, -35P, etc.) and the latest changes and revisions of each equipment publication.

Delete paragraph 2 and substitute:

2. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance a with instructions in TM 38-750.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Forms 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army), NAVSANDA Publication 378 (Navy), and AFR 71-4 (Air Force).

c. Reporting of Equipment Manual Improvements. The direct reporting by the individual user of errors, omissions, and recommendations for improving this manual is authorized and encouraged. DA Form 2028 (recommended changes to DA technical manual parts lists or supply manual 7, 8, or 9) will be used for reporting these improvements. This form will be completed in triplicate using pencil, pen, or typewriter. The original and one copy will be forwarded direct to: Commanding Office, U.S. Army Electronics Materiel Support Agency, ATTN: SELMS-MP, Fort Monmouth, N.J. One information copy will be furnished to the individual's immediate supervisor (e.g., officer, noncommissioned officer, supervisor, etc).

Page 4, paragraph 5*b*, chart, "Item" column (as added by C2, 9 May 60).

First item. After "5U4G" and: (5U4GB, Order No. 7171-PP-59).

Last item. After "LM-52" add: (LM-40, Order No. 7171-PP-59).

Page 11, delete paragraphs 17 and 18 and substitute:

17. Scope of Operator's Maintenance

The maintenance duties assigned to the operator of Oscillator VO-3-D, VO-3-E, and VO-3-F are listed below together with a reference to the paragraph covering the specific maintenance function.

a. Daily preventive maintenance checks and services (par. 18.2).

b. Weekly preventive maintenance checks and services (par. 18.3).

c. Visual inspection (par. 19).

d. Replacement of pilot lamp (par. 20).

e. Replacement of fuse (par. 21).

f. Replacement of tubes (par. 22).

*This change supersedes C2, 9 May 1960.

18. Operator's Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. Systematic Care. The procedures given in paragraphs 18.1 through 22 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services chart (pars. 18.2 and 18.3) outlines functions to be performed at specific intervals. These checks and services are to maintain army electronic equipment in a combat serviceable condition; that is, ill good general (physical) condition and in good operating condition. To assist operators in maintaining combat serviceability, the chart indicates what to check, how to check, and what the normal conditions are. The References column lists the illustrations, paragraphs, or manuals that contain supplementary information. If the defect cannot be remedied by the operator, higher echelon maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

Add paragraphs 18.1 through 18.3.

18.1. Preventive Maintenance Checks and Services Periods

Preventive maintenance checks and services of the VO-3-D, VO-3-E, and VO-3-F are required on a daily and weekly basis.

a. Paragraph 18.2 specifies checks and services that must be performed daily and under the special conditions listed below:

(1) When the equipment is initially installed.

(2) When the equipment is reinstalled after removal fol any reason.

(3) At least once each week if the equipment is maintained in a standby condition.

b. Paragraph 18.3 specifies *additional* checks all services that must be performed once each week.

18.2. Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	Reference
1.	Cabinet exterior.....	***Warning:*** **Cleaning compound is flammable and its fumes are toxic. *Do not* use near a flame and provide adequate ventilation.**	None.
		Inspect for cleanliness. Remove loose dust and dirt with a clean lint-free cloth. Remove other dirt with a cloth dampened (not wet) with cleaning compound. Wipe surface with a clean, lint-free cloth.	Fig. 1.
2.	Pilot lamp.....	While making operating checks (item 4), check for burned-out Pilot lamp.	Fig. 1.
3.	Knob and switch	While making operating checks (item 4), observe that the mechanical action of each knob and switch is smooth and free of external and internal binding. Tap volume control lightly to determine if cutout occurs.	Fig. 1
4.	Operation	Check equipment operation	Par. 13.

18.3. Weekly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	Reference
1	Power cord and plug	Inspect power cord for cuts, kinks, cracks, frays, or other signs of	Fig. 7.
2	Cabinet exterior	Inspect exterior surfaces for paint chips, rust or corrosion	Fig. 1 and TM 9-213
3	Carrying handles (VO-3-D and VO-3-F)	Check handle mounting for tightness	Fig. 7.
4	External connection	Inspect wiring connection at output terminal board, for tightness	Fig. 7.
5	Running spares	Check running spares available to operator	Par. 5*b*.

Page 11, paragraph 30*b* (2) (as added by C 2, 9 May 60). At the end of line 2 add: "except on equipments procured on Order No. 7171-PP-59. On Order No. 7171-PP-59, unscrew (counterclockwise), and remove the defective lamp. Replace it with a new one. Screw the lamp clockwise to secure it into place."

Page 12 and 13. Delete figures 8 and 9.

Page 16 (page 1 of C 1). Delete Appendix I and substitute.

APPENDIX I

REFERENCES

The following is a list of references available to the operator of Oscillator VO-3-D, VO-3-E, and VO-3-F.

AR 70-10	Research and Development (General): Army Materiel Testing.
AR 320-5	Military Terms, Abbreviations and Symbols: Dictionary of United States Army Terms.
AR 320-50	Military Terms, Abbreviations and Symbols: Authorized Abbreviations and Brevity Codes.
AR 750-5	Maintenance of Supplies and Equipment: Organization, Policies, and Responsibilities for Maintenance Operations
Da Pam 108-1	Index of Army Motion Pictures, Film Strips, Slides, and Phono-Recordings.
Da Pam 310-4	Index of Technical Manuals Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
Da Pam 310-21	Military Publications: Index of Supply Manuals Signal Corps.
TM 9-213	Painting Instructions for Field Use.
TM 11-664	Theory and Use of Electronic Test Equipment.
TM 11-2093-10	Operator's Manual: Code Practice Equipments EE-94-F, EE-95-F, EE-96-D, EE-96-E, and EE-96-F, and Telegraphic Code Trainers AN/FGC-T1, AN/FGC-T2, AN/FGC-T3, and AN/FGC-T4 Operators Manual.
TM 38-750	The Army Equipment Record System and Procedures.

By Order of the Secretary of the Army:

EARLE G. WHEELER,
General, United States Army,
Chief of Staff.

Official:
J. C. LAMBERT,
Major General, :United States Army,
The Adjutant General.

Distribution:

Active Army:

DASA (6)
USASA (2)
CNGB (1)
CofEngrs (1)
TSG (1)
CSigO (7)
CofT (1)
CSptS (1)
USA CD Agcy (1)
USCONARC (5)
USAMC (5)
ARADCOM (2)
ARADCOM Rgn (2)
OS Maj Comd (3)
OS Base Comd (2)
LOGCOMD (2)
USAECOM (5)
USAMICOM (4)
USASCC (4)
MDW (1)
Armies (2)
Corps (2)
USA Corps (3)
USATCAD (2)
USAC Engr (2)
USATC Inf (2)
USATC Armor (2)
USASTC (5)
Instl (2) except Ft Monmouth (63)
Svc Colleges (2)
Br Svc Sch (2) except
GEND)EP (OS) (2)
Sig Dep (0S) (12)
Sig Sec, GENI)EP (5)
Army Dep (2) except
Ft Worth (8)
Lexington (12)
Sacramento (28)
Tobyhanna (12)
USA Elect RD Actv, White Sands (13)
USA Elct RD Actv, Ft Huachuca (2)
USA Trans Tml Comd (1)
Army Tml (1)
POE (1)
USAOSA (1)
AMS (1)
WRAMC (1)
AFIP (1)
Army Pic Cen (2)
USA Mbl Spt Cen (1)
USA Elct Mat Agcy (12)
Chicago Proc Dist (1)
USARCARIB Sig Agcy (1)
Sig Fld Maint Shop (3)
Units organized under following TOE's (2 copies each unless otherwise indicated):
11-7
11-16
11-57
11-97
11-98
11-117
11-155
11-157
11-500 (Tms AA-AC) (4)
11-557
11-587
11-592
11-597

NG: State AG (3); units same as Active Army except allowance is one copy to each unit.
USAR: None.
For explanation of abbreviations used, see AR 320-50.

TAGO 492A

☆U.S. GOVERNMENT PRINTING OFFICE:1963
862 821

TECHNICAL MANUAL
OSCILLATORS VO-3-D, VO-3-E, AND VO-3-F, OPERATOR'S MANUAL

TM 11-6940 201-10
CHANGES No. 1

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D.C., *31 March 1959*

TM 11-6940-201-10, 17 September 1958, is changed as follows:

Page 2, paragraph 1. Delete subparagraph *e*.

Page 16. Designate the existing appendix to be I and add the following after appendix I:

*These changes supersede so much of the first echelon portion of SIG 7 & 8 VO-3, 5 March 1957, and C 1, 1 April 1958, as pertains to models VO-3-D, VO-3-E, and VO-3-F.

TAGO 4994A--Apr. 480474°-59

APPENDIX II

OPERATOR MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST FOR OSCILLATORS VO-3-D, VO-3-E, AND VO-3-F (Added)

Section I. INTRODUCTION

1. Scope

a. This appendix lists items supplied for initial operation and for running spares. The list includes tools, accessories, and similar material issued as *part of* the major end item. The list also includes all items authorized for basic operator maintenance of the equipment. End items of equipment are issued on the basis of allowances prescribed in equipment authorized tables and other documents which are a basis for requisitioning.

b. The column headings of section II are defined as follows:

(1) *Federal or technical service stock number* (col. 1). This column lists the 11-digit Federal stock number.

(2) *Repair parts source, maintenance and recoverability code* (col. 2). Not used.

(3) *Designation by model* (col. 3). Each subdivision of this column will be used for a specific model or for groups of equipment as noted. A dagger (†) in one of these columns indicates that the part is used in that model.

(4) *Description* (col. 4). Nomenclature or the standard item name and brief identifying (data for each item are listed in this column. When requisitioning, enter the nomenclature and description on the requisition.

(5) *Unit of issue* (col. 5). The unit of issue is the supply term applied to the smallest quantity by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

(8) *Expendability* (col. 6). Expendable items are indicated by the letter X; non-expendable items are indicated by NX.

(7) *Quantity authorized* (col. 7). Under items comprising an operable equipment the column lists the quantity of items supplied for the initial operation of the (equipment. Under running spares anti accessories the quantities listed are those issued initially with the equipment as spare parts. The quantities are authorized to be kept on hand by the operator for maintenance of the equipment.

(8) *Illustration* (fig. No.) (col. 8). The numbers in this column refer to the illustration where the part is shown.

(9) *Illustration.* (Item No.) (col. 9). Not used.

2. Tube Consumption Rates

The consumption rates given in this appendix for tubes are conservative theoretical (estimates, and are provided for use only where no better information, such as data based on operating experience, is available. These figures are based on levels and requirements for equipment actually in use, not on authorizations or equipment stored in depots.

Section II. FUNCTIONAL PARTS LIST

(1) FEDERAL OR TECHNICAL SERVICE STOCK NUMBER	(2) REPAIR PARTS SOURCE, MAINTENANCE AND RECOVERABILITY CODE	(3) DESIG-NATION BY MODEL	(4) DESCRIPTION	(5) UNIT OF ISSUE	(6) EXPENDABILITY	(7) QUANTITY AUTHORIZED	(8) ILLUSTRATION FIGURE NO.	(9) ILLUSTRATION ITEM NO.
		1 2 3	ITEMS COMPRISING AN OPERABLE EQUIPMENT					
			OSCILLATOR VO-3-D,E,F					
			NOTE: Model Column 1 refers to VO-3-D; Column 2 refers to VO-3-E; Column 3 refers to VO-3-F					
6910-191-9650			OSCILLATOR VO-3-D,E,F	ea	NX			
Order thru AGC		* * *	TECHNICAL MANUAL TM 11-6910-201-10	ea	X	2		
6910-511-6579		*	COVER, OSCILLATOR: Steel; 12-1 32 in lg x 7 in w x 6 in h o a; Sig dwg No. SC-D-32812	ea	NX	1		
5960-188-3918		*	ELECTRON TUBE: MIL type 5U4G	ea	X	1	1	
5960-262-0218		*	ELECTRON TUBE: MIL type 5Y3WGTA	ea	X	1	1	
5960-188-8602		*	ELECTRON TUBE: MIL type 5Y1GT	ea	X	1	1	
5960-188-3577		* *	ELECTRON TUBE: MIL type 6SN7WGT	ea	X	1	1	
5960-188-3571		*	ELECTRON TUBE: MIL type 6SJ7WGT	ea	X	1	1	
5960-116-9927		* *	ELECTRON TUBE: MIL type 6V6GTY	ea	X	2	1	
5960-188-3557		*	ELECTRON TUBE: MIL type 7C5	ea	X	2	1	
5960-188-3581		*	ELECTRON TUBE: MIL type 7C7	ea	X	1	1	
5960-188-3519		*	ELECTRON TUBE: MIL type 7F7	ea	X	1	1	
5920-050-4953		*	FUSE, CARTRIDGE: 1.5 amp; MIL, type F02G1R50A	ea	X	1	1	
5920-280-1166		*	FUSE, CARTRIDGE: 2 amp; MIL type F02G2R00A	ea	X	1	1	
5920-011-2630		*	FUSE, CARTRIDGE: Fuse FU-25; 5 amp; MIL type F01A5R00A	ea	X	1	1	
6240-019-3116		*	LAMP LM-25: GE No. 40	ea	X	1	1	
6240-155-8706		*	LAMP LM-52	ea	X	1	1	
			RUNNING SPARES AND ACCESSORY ITEMS OSCILLATOR VO-3-D,E,F					
6910-191-9650			OSCILLATOR VO-3-D,E,F	ea	NX			
5960-188-3918		*	ELECTRON TUBE: MIL type 5U4G	ea	X	1	1	
5960-262-0218		*	ELECTRON TUBE: MIL type 5Y3WGTA	ea	X	1	1	
5960-188-8602		*	ELECTRON TUBE: MIL type 5Y1GT	ea	X	1	1	
5960-188-3577		* *	ELECTRON TUBE: MIL type 6SN7WGT	ea	X	1	1	
5960-188-3571		*	ELECTRON TUBE: MIL type 6SJ7WGT	ea	X	1	1	

(1) FEDERAL OR TECHNICAL SERVICE STOCK NUMBER	(2) REPAIR PARTS SOURCE, MAINTENANCE AND RECOVERABILITY CODE	(3) DESIGNATION BY MODEL 1	2	3	(4) DESCRIPTION	(5) UNIT OF ISSUE	(6) EXPENDABILITY	(7) QUANTITY AUTHORIZED	(8) ILLUSTRATION FIGURE NO.	(9) ILLUSTRATION ITEM NO.
					VO-3 D,E,F (continued)					
5960-116-9927			*	*	ELECTRON TUBE: MIL type 6V6GTY	ea	X	1	1	
5960-188-3357		*			ELECTRON TUBE: MIL type 7C5	ea	X	1	1	
5960-188-3581		*			ELECTRON TUBE: MIL type 7C7	ea	X	1	1	
5960-188-3519		*			ELECTRON TUBE: MIL type 7F7	ea	X	1	1	
5920-050-4953		*			FUSE, CARTRIDGE: 1.5 amp; MIL type FO2G1R50A	ea	X	5	1	
5920-280-4166				*	FUSE, CARTRIDGE: 2 amp; MIL type FO2G2R00A	ea	X	5	1	
5920-011-2630			*		FUSE, CARTRIDGE: Fuse FU-25; 3 amp; MIL type FO14.5R00A	ea	X	5	1	
6210-019-3116			*		LAMP LM-25: GE No. 10	ea	X	1	1	
6210-153-8706		*		*	LAMP LM-52	ea	X	1	1	

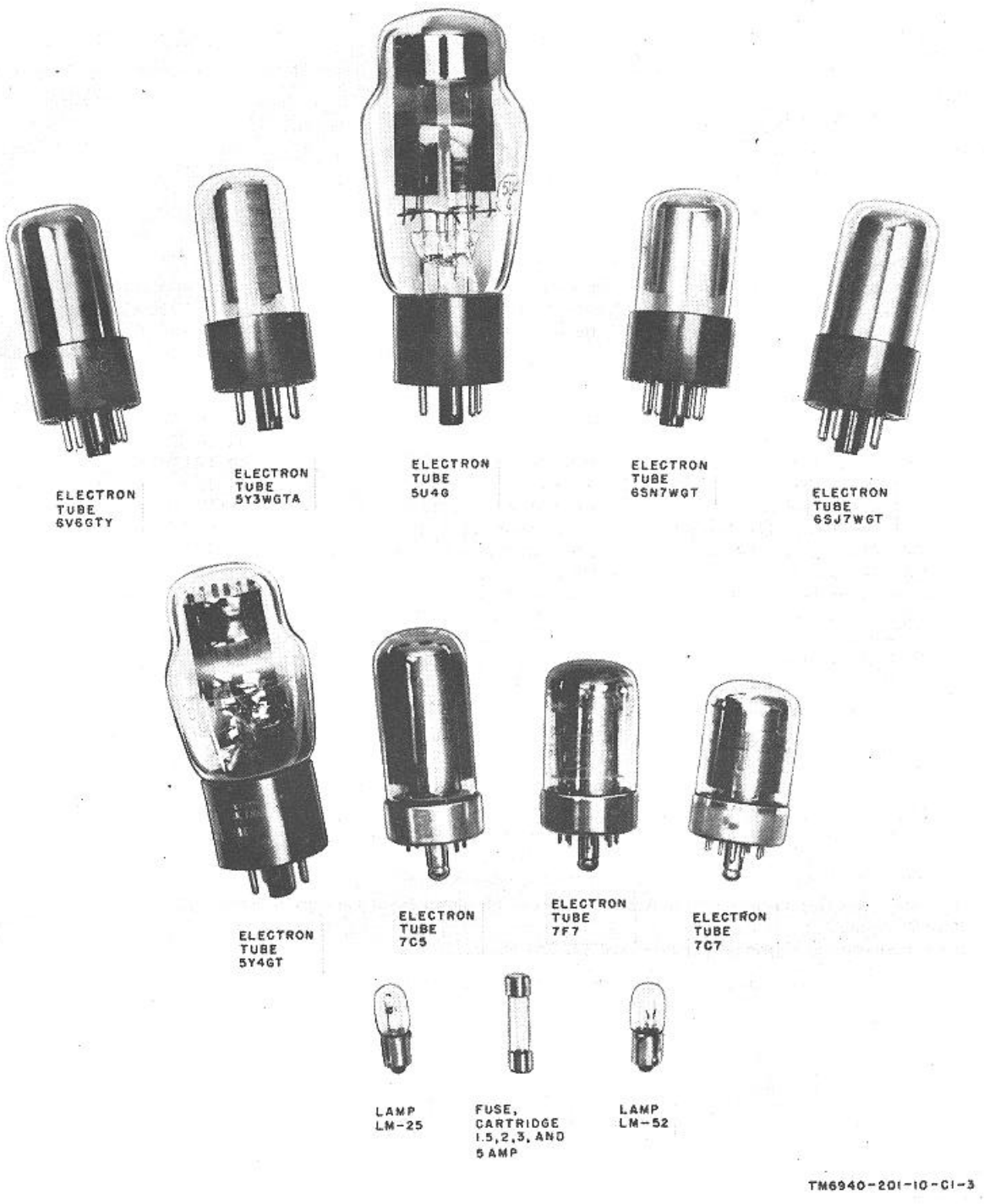


Figure 1. Electron tubes, fuses, and lamps.

[AG 413.44 (12 Mar 59)]

By Order of *Wilber M. Brucker*, Secretary of the Army:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of staff

Official:

R. V. LEE,
Major General United States Army,
The Adjutant General

Distribution

Active Army:

ASA (2)
CNGB (1)
Tech Stf, DA (1) except CSigO (30)
Tech Stf Bd (1)
USCONARC (5)
USA Arty lid (1)
USA Armor Bd (1)
USA Armor Bd Test Sec (1)
USA Inf Bd (1)
USA Air Def Bd (1)
USA Air Def Bd Test Sec (1)
USA Abn & Elct Bd (1)
USA Avn Bd (1)
USA Arctic Test Bd (1)
US ARADCOM (2)
US ARADCOM Rgn (2)
OS Maj Comd (5)
OS Base Comd (5)
Log Comd (5)
MDW (1)
Armies (5) except first US Army (7)
Corps (2)
Div (2)
USATC(2)
Yuma Test Sta (2)
USA Elct PG (1)
Svc Colleges (5)
Br Svc Sch (5) except USASCS (25)
Gen Depots (2) except Atlanta Gen Depot (none)
Sig Sec, Gen Depots (10)
Sig Depots (17)
AFIP (1)
WRAMC (1)
AMS (1)
Engr Maint Cen (1)
USA Comm Agcy (2)
USA Sig Comm Engr Agcy (1)
USA Sig Eqt Spt Agcy (2)
USA Sig Msl Spt Agcy (13)
Port of Emb (OS) (2)
Trans Terminal (1)
Army Terminals (1)
OS Sup Agcy (21)
Sig Fld Maint Shops (3)
Sig Lab (5)
Mil Dist (1)
USA Corps (Res) (1)
Sector, USA Corps, (Res) (1)
TASSA (15)
Midwestern Rgn Ofc (TASSA) (1)
USA Sig Pubs Agcy (8)
Army Pictorial Cen (2)
USA Ord Msl Comd (3)
USMA (5)
Units organized under following TOE's:
11-7 (2)
11-15 (2)
11-16 (2)
11-17 (2)
11-18 (2)
11-57 (2)
11-97 (2)
11-116 (2)
11-117 (2)
11-500 AA-AE (2)
11-537 (2)
11-557 (2)
11-587 (2)
11-592 (2)
11-597 (2)
20-300 (2)
32-51 (2)
32-55 2)
32-56 (2)
32-500 (2)
33-2 (2)

NG: State AG (3); units same as Active Army except allowance is one copy to each unit.
USAR: None.
For explanation of abbreviation used, see AR 320-50.

TAGO 4994A

☆U. S. GOVERNMENT PRINTING OFFICE: 1959

TECHNICAL MANUAL
No. 11-6940-201-10

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *17 September, 1958*

OSCILLATORS VO-3-D, VO-3-E, AND VO-3-F

OPERATOR'S MANUAL

		Paragraphs	Page
CHAPTER 1.	INTRODUCTION		
Section I.	General.		
	Scope	1	2
	Forms and records	2	2
II.	Description and data.		
	Purpose and use	3	2
	Technical characteristics	4	2
	Components of Oscillator VO-3-(*)	5	4
	Description	6	4
	Differences in models	7	4
	Typical application	8	4
CHAPTER 2.	SERVICE UPON RECEIPT OF EQUIPMENT		
	Unpacking	9	5
	Checking unpacked equipment	10	5
	Installation	11	5
3.	OPERATING INSTRUCTIONS		
Section I.	Operation under usual conditions.		
	Controls	12	9
	Operation	13	9
II.	Operation under unusual conditions.		
	Operation at low temperatures	14	9
	Operation under tropical conditions	15	9
	Operation in desert climates	16	9
CHAPTER 4.	MAINTENANCE INSTRUCTIONS		
	Scope of operator's maintenance	17	11
	Preventive maintenance	18	11
	Visual inspection	19	11
	Replacement of pilot lamp	20	11
	Replacement of fuse	21	11
	Replacement of tubes	22	14
5.	SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE		
	Shipment and limited storage	23	15
	Demolition of materiel to prevent enemy use	24	15
APPENDIX	REFERENCES	....	16

*TM 11-6940-201-10 supersedes so much of TM 11-5061, 6 January 1954, as is applicable to operation of the equipment.

CHAPTER 1

INTRODUCTION

Section I GENERAL

1. Scope

a. This manual describes Oscillators VO-3-D, VO-3-E, and VO-3-F and covers their installation, operation, and operator's maintenance. It includes operation under usual and unusual conditions, cleaning and inspection of the equipment, and replacement of parts available to first echelon maintenance.

b. Official nomenclature followed by (*) is used to indicate all models of the equipment item covered in this manual. Thus Oscillator VO-3-(*) represents Oscillators VO-3-D, VO-3-E, and VO-3-F.

c. Throughout the manual, the major component of Oscillator VO-3-(*) is referred to as the *oscillator.*

d. Maintenance Allocation Charts will be included in TM 11-6940-201-20.

e. See SIG 7 & 8 VO-3, Oscillator VO-3 A, B, C, D, E, F, for maintenance parts information.

2. Forms and Records

a. Unsatisfactory Equipment Reports.

(1) Fill out and forward DA Form 468 (Unsatisfactory Equipment Report), to the Commanding Officer, U.S. Army Signal Equipment Support Agency, Fort Monmouth, New Jersey, as prescribed in AR 700-38.

(2) Fill out and forward AF TO Form 29 (Unsatisfactory Report), to the Commander, Air Materiel Command, Wright-Patterson Air Force Base, Ohio, as prescribed in AF TO OO-35D-54.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment), as prescribed in AR 700-58 (Army), Navy Shipping Guide, Article 1850-4 (Navy), and AFR 71-4 (Air Force).

c. Preventive Maintenance Forms. Prepare DA Form 11-238 (figs 8 and 9) (Maintenance Checklist for Signal Equipment) (Sound Equipment, Radio, Direction Finding, Radar, Carrier, Radiosonde and Television), in accordance with instructions on the form.

d. Parts List Form. Forward DA Form 2028 (Recommended Changes to DA Technical Manual Parts Lists or Supply Manuals 7, 8, and 9), directly to the Commanding Officer, U.S. Army signal Equipment Support Agency, Fort Monmouth, New Jersey, for comments on parts listings.

e. Comments on Manual. Forward all other comments on this publication directly to the Commanding Officer, U. S. Army Signal Publications Agency, Fort Monmouth, New Jersey.

Section II DESCRIPTION AND DATA

3. Purpose and Use

(fig. 1)

a. Purpose. The purpose of Oscillator VO-3-(*) is to furnish a constant tone output of 800 cycles per second (cps).

b. Use. The oscillator furnishes constant tone to switchboards for code training purposes and is part of several code training sets (par. 8).

4. Technical Characteristics

Number of tubes:
- VO-3-D..... 5.
- VO-3-E..... 5.
- VO-3-F ..... 4.

Output frequency..... 800 cps ± 10 percent.
Power output ..... 10 watts
Output impedance:
- VO-3-D..... 2, 4, 8, 16, or 500 ohms.
- VO-3-E..... 2, 4, 8, 16, or 500 ohms.
- VO-3-F ..... .4, 8, 12, or 16 ohms.

Voltage input ..... 110 to 130 volts ac, 50 to 60 cps.

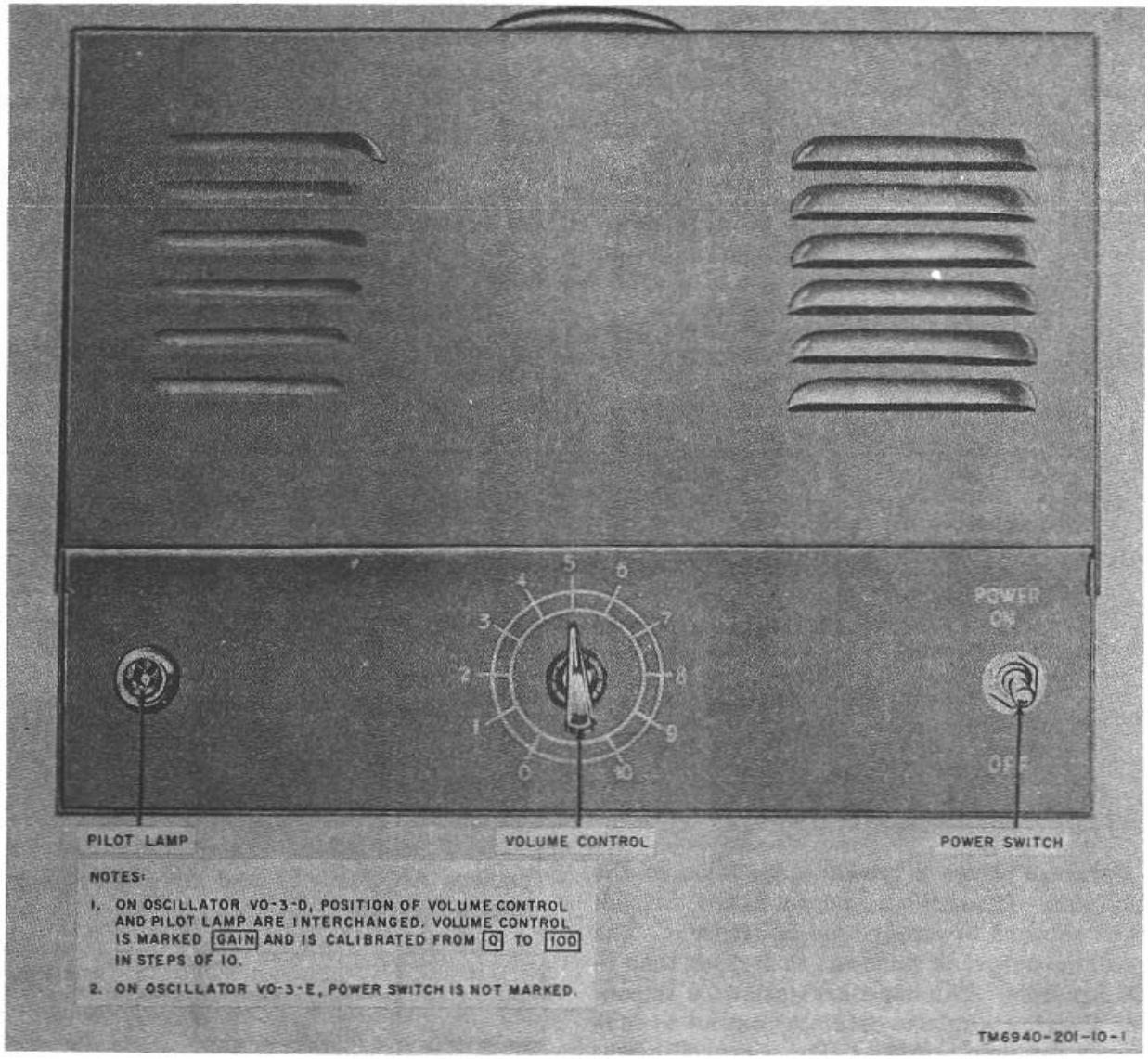


Figure 1. Oscillator VO-3-F, less running spares.

5. Components of Oscillator VO-3-(*)

a. Oscillator. The oscillator (fig. 1) is a self-contained unit. The dimensions of the oscillator are 10 1/4 inches high by 12 inches wide by 8 1/4 inches deep and the weight is 22 pounds.

b. Running Spares.

Quantity			Item
VO-8-D	VO-3-E	VO-3-F	
		1	Electron tube 5U4G
	1		Electron tube 5Y3WGTA
1			Electron tube 5Y4GT
	1		Electron tube 6SJ7WGT
	1	1	Electron tube 6SN7WGT
	1	1	Electron tube 6V6GTY
1			Electron tube 7C5
1			Electron tube 7C7
1			Electron tube 7F7
5			Fuse, 1.5 amperes
		5	Fuse, 2 amperes
	5		Fuse, 5 amperes
	1		Lamp LM-25
1		1	Lamp LM-52

6. Description

Oscillator VO-3-(*) is a fixed audio frequency signal generator. The operating controls (fig. 1) are located on the front panel of the oscillator. A permanently attached power cable (fig. 7) and the output terminal board are located on the rear panel.

7. Differences in Models

Oscillators VO-3-D, VO-3-E, and VO-3-F are similar in purpose, operation, and appearance. The differences between models of the oscillator are as follows.

Item	VO-3-D	VO-3-E	VO-3-F
Front panel:			
Volume control markings.	Gain 0 to 100.	Volume 0 to 10.	0 to 10.
Location of:			
Volume control.	Left side.	Center.	Center.
Pilot lamp.	Center.	Left side.	Left side.
Output impedance.	2, 4, 8, 16, or 500 ohms.	2, 4, 8, 16, or 500 ohms.	4, 8, 12, or 16 ohms.
Number of carrying handles.	Two.	None.	One.

8. Typical Application

Figure 2 shows a typical application of the oscillator. The oscillator output is fed through a switchboard to supply tone to headsets. The oscillator output is sufficient to furnish tone to 200 headsets. The hand keys are used to convert the constant tone oscillator output to code signals for code practice. For a typical application refer to TM 112093-10, Code Practice Equipments EE-94-F, EE-95-F, EE-96-D, EE-96-E, and EE-96-F and Telegraphic Code Trainers AN/FGC-T1 and AN/FGC-T4, Operator's Manual.

Figure 2. Typical application of oscillator.

CHAPTER 2

SERVICE UPON RECEIPT OF EQUIPMENT

9. Unpacking

(fig. 3)

a. Packaging Data. Oscillator VO-3-(*) is packed for shipment in a wooden packing case. The dimensions of the packed equipment are 17 by 12 by 11 inches; the weight is 45 pounds and the volume is 1.3 cubic feet.

b. Removing Contents.

(1) Cut and fold back the metal straps.

(2) Remove the nails from the wooden cover with a nail puller. Do not attempt to pry off the wooden cover; prying may damage the equipment. Remove the wooden cover and expose the moisture-vaporproof barrier.

(3) Cut the moisture-vaporproof barrier and expose the outer corrugated carton.

(4) Open the outer corrugated carton and remove the inner corrugated cartons.

(5) Open the large inner corrugated carton and remove the oscillator.

(6) Open the small inner corrugated carton and remove the tubes, tube clamps, spare lamp, and spare fuses.

10. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, refer to paragraph 2.

b. See that the equipment is complete as 'listed on the packing slip. If a packing slip is not available, check it against the table of components (par. 5).

c. If the equipment has been used or is reconditioned, see whether it has been changed by a Modification Work Order (MWO). If modified, the MWO number will appear on the front panel near the nomenclature plate.

11. Installation

a. Installation of Tubes. The oscillator is shipped with all tubes removed. Install the tubes as instructed below.

(1) Remove the screws (not shown) that secure the dust cover to the chassis; remove the dust cover.

(2) Install the tubes in the locations indicated in figures 4 through 6.

(3) On Oscillator VO-3-F, secure each tube with a tube clamp.

(4) Replace the dust cover and secure it in place.

b. Installation of Oscillator.

(1) Connect the oscillator output, from the output terminal board (fig. 7), to the switchboard.

Note

Refer to the technical manual for the code practice equipment being used to determine the output terminals (impedance) and the switchboard terminals to be used.

(3) Check to see that the power switch (fig. 1) is in the off (down) position; connect the power cable to a 110- to 130-volt, 50- to 60-cycle power source.

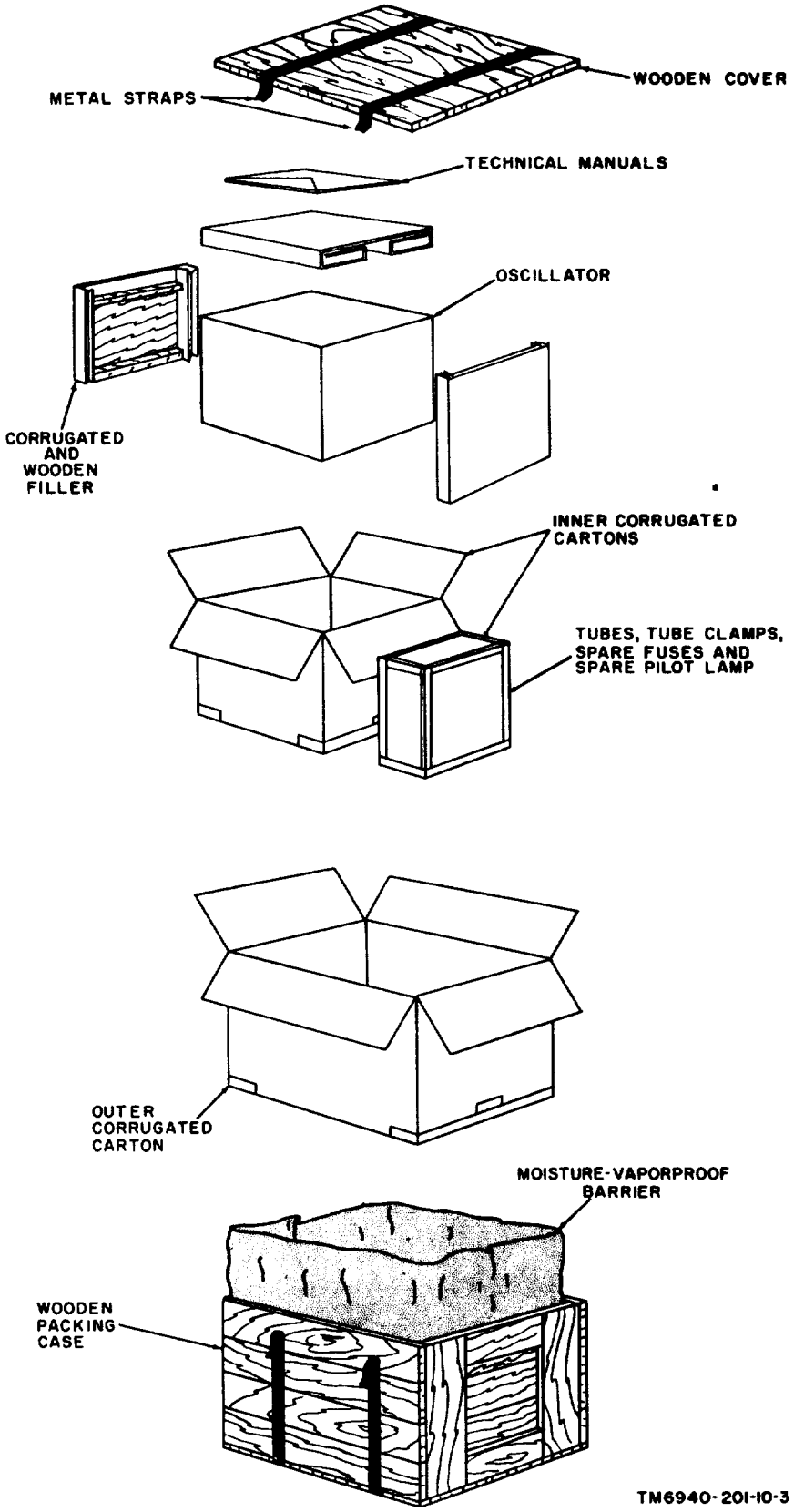


Figure 3. Packaging diagram.

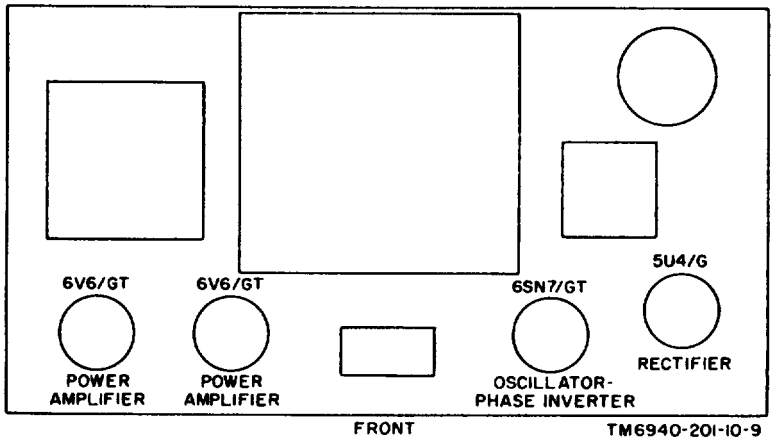


Figure 4. Oscillator VO-3-D, tube location.

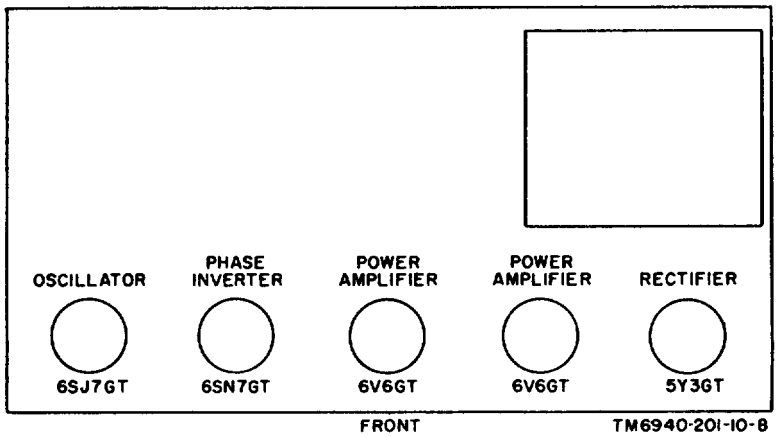


Figure 5. Oscillator VO-3-E, tube location.

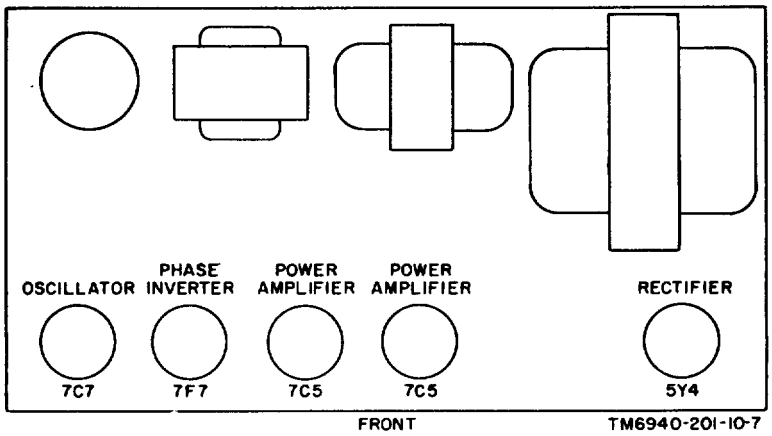


Figure 6. Oscillator VO-F, tube location.

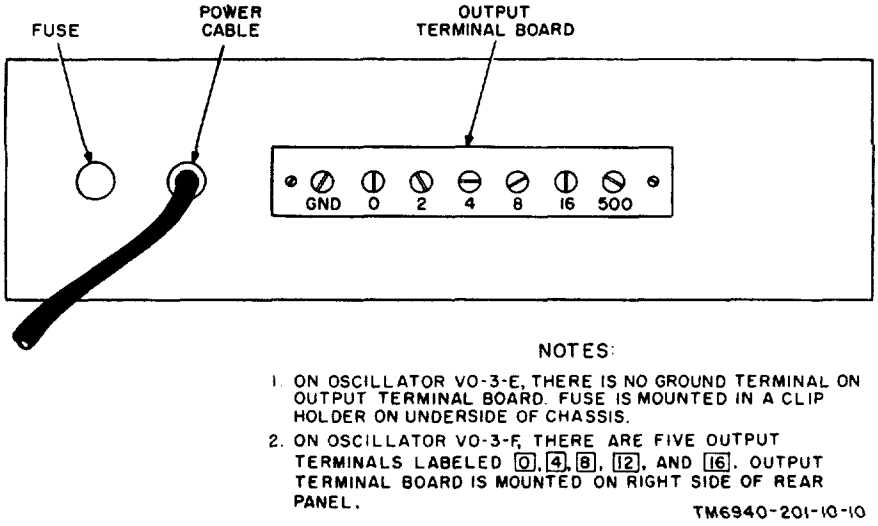


Figure 7. Oscillator VO-3-D, rear panel.

CHAPTER 3

OPERATING INSTRUCTIONS

Section I. OPERATION UNDER USUAL CONDITIONS

12. Controls

(fig. 1)

The operation of Oscillators VO-3-D, VO-3-E, and VO-3-F is similar. However, the equipment markings for the operating controls are not the same on all the oscillators. The following chart lists the common name assigned to each control, the function of the control, and the equipment marking for that control on each of the oscillators.

13. Operation

(fig. 1)

a. Starting Procedure. Turn the oscillator on by placing the power switch in the on (up) position. The pilot lamp will light.

b. Operating Procedure. Adjust the volume control to the position giving the desired out put level (par. 8).

c. Stopping Procedure. Turn the oscillator off by placing the power switch in the off (down) position.

Common name	Function	Equipment marking		
		VO-3-D	VO-3-E	VO-3-F
Power switch	Turns oscillator on and off.	ON-OFF	Not marked	POWER ON-OFF
Volume control	Adjusts level of output signal.	GAIN 0 to 100	VOLUME 0 to 10	0 to 10
Pilot lamp	Lights when power switch is operated to on to indicate that ac power is applied to oscillator.			

Section II. OPERATION UNDER UNUSUAL CONDITIONS

14. Operation at Low Temperatures

Subzero temperatures and climatic conditions associated with cold weather affect the efficient operation of the equipment. Instructions and precautions for operation under such adverse conditions are as follows:

a. Keep the equipment warm and dry.

b. Locate the equipment inside a heated inclosure where there is no danger of a cold draft striking the glass tubes when a door is opened. A sudden draft of cold air is often sufficient to shatter the glass envelope of a heated tube. If the inclosure is so constructed that this precaution is impossible, place a blanket or some other barrier between the source of the cold draft and the equipment.

c. When equipment that has been exposed to the cold is brought into a warm room, it will sweat until it reaches room temperatures. This condition also arises before the equipment warms up during the day after exposure during a cold night. When the equipment has reached room temperature, dry it thoroughly.

15. Operation Under Tropical Conditions.

When operated in tropical climates, electronic equipment may be installed in tents or huts. When equipment is installed below ground and when it is set up in swampy areas, moisture conditions are more acute than normal. Ventilation is usually very poor, and the high relative humidity causes condensation of moisture on the equipment whenever the temperature of the equipment becomes lower than that of the ambient air. To minimize this condition, keep the power on as long as possible.

16. Operation in Desert Climates

a. Conditions similar to those encountered in tropical areas often prevail in desert areas. Use the same

measures to insure proper operation of the equipment.

b. Never tie power cables or other wiring connections to the inside or the outside of tents. Desert areas are subject to sudden wind squalls which may jerk the connections loose or break the lines.

c. Take care to keep the equipment as free from dust as possible. Make frequent preventive maintenance checks.

CHAPTER 4

MAINTENANCE INSTRUCTIONS

17. Scope of Operator's Maintenance

a. A list of maintenance duties normally performed by the operator of the oscillator follows. These procedures do not require special tools or test equipment.

b. Operator's maintenance for the oscillator consists of the following:

(1) Preventive maintenance (par. 18).

(2) Visual inspection (par. 19).

(3) Replacement of defective pilot lamp (par. 20).

(4) Replacement of defective fuse (par. 21).

(5) Replacement of defective tubes (par. 22).

18. Preventive Maintenance

DA Form 11-238 (figs. 8 and 9) is a preventive maintenance checklist to be used by the operator. Items not applicable to the oscillator are lined out in the figures. References in the ITEM block in figure 9 are to paragraphs that contain additional maintenance information pertinent to the particular item. Instructions for the use of the form appear on the form.

19. Visual Inspection

When the equipment fails to perform properly, turn off the power and check each of the items listed below. Do not check any item while the power is on.

a. Wrong settings of controls (par. 12).

b. Disconnected power cable or output cable (par. 11*b*).

c. Defective fuse (usually indicates some other fault).

20. Replacement of Pilot Lamp

(fig. 1)

When the oscillator operates normally but the pilot lamp does not light, the pilot lamp is probably defective. Replace the pilot lamp with one known to be good. If the pilot lamp still does not light, higher echelon repair is required. Replace the pilot lamp in Oscillator VO-3-D or VO-3-E by following the procedure given in *a* below; replace the pilot lamp in Oscillator VO-3-F by following the procedure given in b below.

a. Oscillators VO-3-D and VO-3-E.

(1) Remove the screws that secure the bottom plate (not shown) to the chassis; remove the bottom plate.

(2) Press in on the lamp and turn it counterclockwise to unlock.

(3) Pull the defective lamp out and replace it with a new one. Push the lamp in and twist it clockwise to lock.

(4) Replace the bottom plate on the chassis and secure it in place.

b. Oscillator VO-3-F.

(1) Unscrew (counterclockwise) the glass indicator jewel and remove it to expose the lamp.

(2) Perform the procedures given in *a* (2) and (3) above.

(3) Screw (clockwise) the glass indicator jewel onto the lampholder.

21. Replacement of Fuse

(fig. 7)

If the fuse is defective, replace it with a new one. If the new fuse blows when power is applied, high echelon repair is required. Replace the fuse in Oscillator VO-3-D or VO-3-F by following the procedure given in a below; replace the fuse in Oscillator VO-3-E by following the procedure given in b below.

a. Oscillators VO-3-D and VO-3-F.

(1) Turn the fuse holder cap counterclockwise to unlock.

(2) Pull out the fuse holder cap with the defective fuse. Remove the defective fuse and replace it with a new one.

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
26. [illegible]	
27. [illegible]	
28. [illegible]	

IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING THE INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.

ITEM 7. POWER CABLE FRAYED.
REPORTED TO 2ND ECHELON FOR REPAIR.

MAINTENANCE CHECK LIST FOR SIGNAL EQUIPMENT
SOUND EQUIPMENT, RADIO, DIRECTION FINDING RADAR, CARRIER, RADIOSONDE AND TELEVISION

(AR 750-625)

EQUIPMENT NOMENCLATURE

OSCILLATOR VO-3-F

EQUIPMENT SERIAL NUMBER

347

INSTRUCTIONS

This form may be used for a period of one month by using the correct dates and weeks of the month. It is to be used as a Preventive Maintenance check list for Signal equipment in actual use, or for a check on equipment prior to issue.

1. For detailed Preventive Maintenance instructions see:
   a. The Technical Manual *(in TM 11 series)* for the equipment. *(See DA Pamphlet Number 310-4)*
   b. The Supply Bulletin *(SB 11-100 series)* for the equipment. *(See DA Pamphlet Number 310-4)*
   c. The Department of the Army Lubrication Order. *(See DA Pamphlet Number 310-4)*

2. The following action will be taken by either the Communications Officer/ Chief for 1st echelon, or the Inspector for higher echelon:
   a. Enter Equipment Nomenclature and Serial Number.
   b. Strike out items that do not apply to the equipment.

3. Operator/Inspector will enter in the columns entitled CONDITION, on the proper line, a notation regarding the condition, using symbols specified under LEGEND.

4. After operator completes each daily inspection he will initial over the appropriate dates under "Daily Condition for Month", then return form to his supervisor.

FOLD

TYPE OF INSPECTION

OPERATOR	2/3 ECHELON	DATE	SIGNATURE
✓		2 July 1958	John Jackson

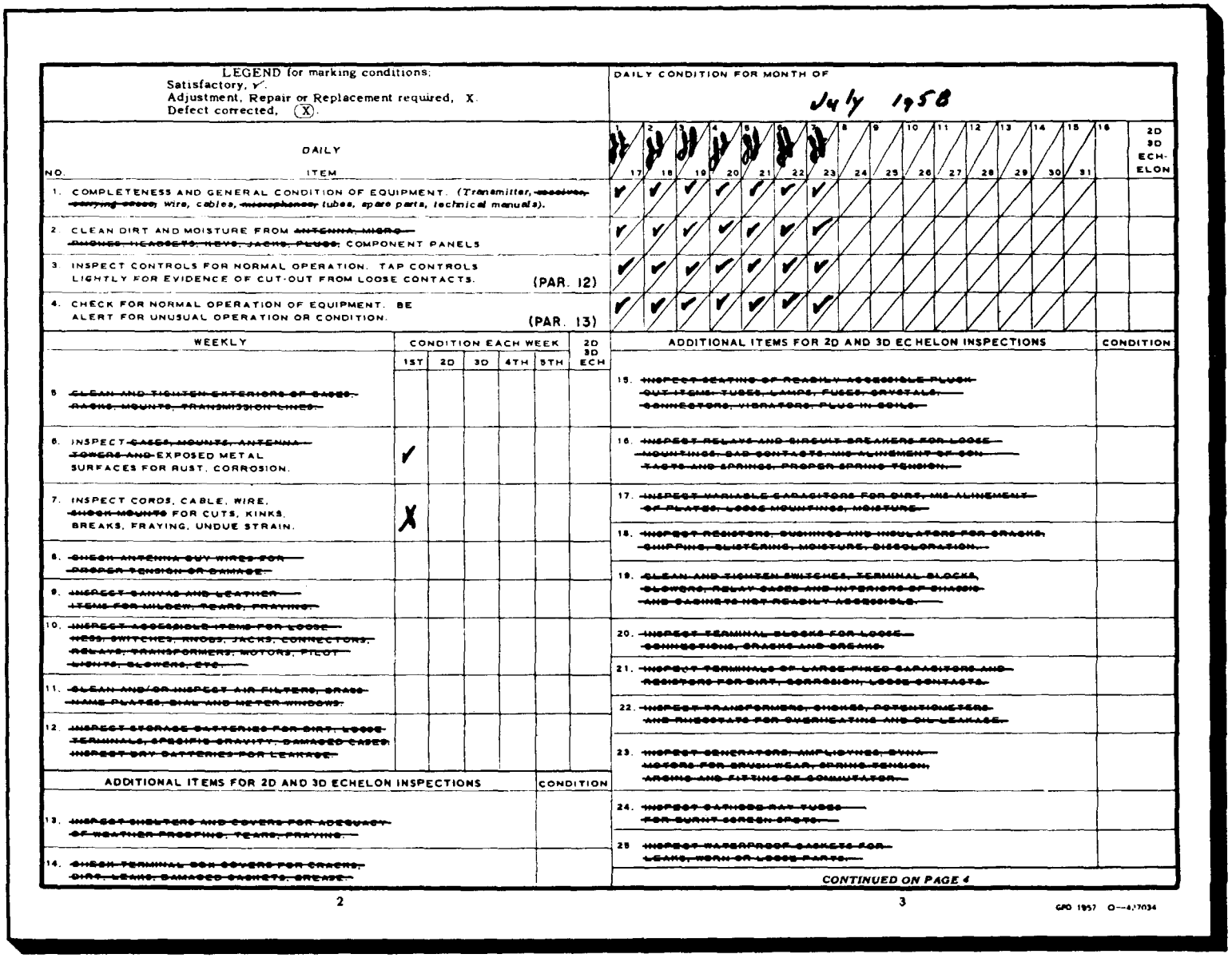
4

DA FORM 1 MAY 57 11-238

REPLACES DA FORMS 11-238, 1 NOV 55; 11-239, 11-244, 11-245, 11-246, 11-249, 11-250, AND 11-251; WHICH ARE OBSOLETE.

TM6940-201-10-5

Figure 8. DA Form 11-238, pages 1 and 4.



LEGEND for marking conditions:
Satisfactory, ✓.
Adjustment, Repair or Replacement required, X.
Defect corrected, (X).

DAILY CONDITION FOR MONTH OF July 1958

NO.	DAILY ITEM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	2D 3D ECHELON
		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
1.	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT. (Transmitter, ~~receiver, carrying cases~~, wire, cables, ~~microphones~~, tubes, spare parts, technical manuals).	✓	✓	✓	✓	✓	✓	✓										
2.	CLEAN DIRT AND MOISTURE FROM ~~ANTENNA, MICRO-PHONES, HEADSETS, KEYS, JACKS, PLUGS~~; COMPONENT PANELS	✓	✓	✓	✓	✓	✓	✓										
3.	INSPECT CONTROLS FOR NORMAL OPERATION. TAP CONTROLS LIGHTLY FOR EVIDENCE OF CUT-OUT FROM LOOSE CONTACTS. (PAR. 12)	✓	✓	✓	✓	✓	✓	✓										
4.	CHECK FOR NORMAL OPERATION OF EQUIPMENT. BE ALERT FOR UNUSUAL OPERATION OR CONDITION. (PAR. 13)	✓	✓	✓	✓	✓	✓	✓										

WEEKLY	CONDITION EACH WEEK 1ST	2D	3D	4TH	5TH	2D 3D ECH
5. ~~CLEAN AND TIGHTEN EXTERIORS OF CASES, RACKS, MOUNTS, TRANSMISSION LINES.~~						
6. INSPECT ~~CASES, MOUNTS, ANTENNA TOWERS AND~~ EXPOSED METAL SURFACES FOR RUST, CORROSION.	✓					
7. INSPECT CORDS, CABLE, WIRE, ~~SHOCK MOUNTS~~ FOR CUTS, KINKS, BREAKS, FRAYING, UNDUE STRAIN.	X					
8. ~~CHECK ANTENNA GUY WIRES FOR PROPER TENSION OR DAMAGE.~~						
9. ~~INSPECT CANVAS AND LEATHER ITEMS FOR MILDEW, TEARS, FRAYING.~~						
10. ~~INSPECT ACCESSIBLE ITEMS FOR LOOSE KNOBS, SWITCHES, KNOBS, JACKS, CONNECTORS, RELAYS, TRANSFORMERS, MOTORS, PILOT LIGHTS, BLOWERS, ETC.~~						
11. ~~CLEAN AND/OR INSPECT AIR FILTERS, GRAPH-ITE PLATES, DIAL AND METER WINDOWS.~~						
12. ~~INSPECT STORAGE BATTERIES FOR DIRT, LOOSE TERMINALS, SPECIFIC GRAVITY, DAMAGED CASES. INSPECT DRY BATTERIES FOR LEAKAGE.~~						

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
13. ~~INSPECT SHELTERS AND COVERS FOR ADEQUACY OF WEATHER PROOFING, TEARS, FRAYING.~~	
14. ~~CHECK TERMINAL BOX COVERS FOR CRACKS, DIRT, LEAKS, DAMAGED GASKETS, GREASE.~~	

ADDITIONAL ITEMS FOR 2D AND 3D EC HELON INSPECTIONS	CONDITION
15. ~~INSPECT SEATING OF READILY ACCESSIBLE PLUG-OUT ITEMS: TUBES, LAMPS, FUSES, CRYSTALS, CONNECTORS, VIBRATORS, PLUG-IN COILS.~~	
16. ~~INSPECT RELAYS AND CIRCUIT BREAKERS FOR LOOSE MOUNTINGS, BAD CONTACTS, MIS-ALINEMENT OF CON-TACTS AND SPRINGS, PROPER SPRING TENSION.~~	
17. ~~INSPECT VARIABLE CAPACITORS FOR DIRT, MIS-ALINEMENT OF PLATES, LOOSE MOUNTINGS, MOISTURE.~~	
18. ~~INSPECT RESISTORS, BUSHINGS AND INSULATORS FOR CRACKS, CHIPPING, BLISTERING, MOISTURE, DISCOLORATION.~~	
19. ~~CLEAN AND TIGHTEN SWITCHES, TERMINAL BLOCKS, BLOWERS, RELAY CASES AND INTERIORS OF CHASSIS AND CABINETS NOT READILY ACCESSIBLE.~~	
20. ~~INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS.~~	
21. ~~INSPECT TERMINALS OF LARGE FIXED CAPACITORS AND RESISTORS FOR DIRT, CORROSION, LOOSE CONTACTS.~~	
22. ~~INSPECT TRANSFORMERS, CHOKES, POTENTIOMETERS AND RHEOSTATS FOR LUBRICATING AND OIL LEAKAGE.~~	
23. ~~INSPECT GENERATORS, AMPLIDYNES, DYNA-MOTORS FOR BRUSH WEAR, SPRING TENSION, ARCING AND PITTING OF COMMUTATOR.~~	
24. ~~INSPECT CATHODE RAY TUBES FOR BURNT SCREEN SPOTS.~~	
25. ~~INSPECT WATERPROOF GASKETS FOR LEAKS, WORN OR LOOSE PARTS.~~	

CONTINUED ON PAGE 4

2 3

GPO 1957 O—417034

TM6940-201-10-6

Figure 9. DA Form 11-238, pages 2 and 3.

(3) Insert the fuse holder cap, with the new fuse, in the fuse holder. Press in on the fuse holder cap and turn it clockwise to lock.

b. Oscillator VO-3-E.

(1) Remove the screws that secure the bottom plate (not shown) to the chassis.

(2) Remove the defective fuse from the fuse holder.

(3) Press a new fuse into the fuse holder.

(4) Replace the bottom plate on the chassis and secure it in place.

22. Replacement of Tubes

(figs. 4, 5, and 6)

If there is no output from the oscillator, the trouble may be a defective tube. Check the tubes, one at a time, by substituting with tubes known to be good. If the new tube does not correct the trouble, replace the original tube. If the oscillator is still inoperative after all tubes have been checked, higher echelon repair is required. On Oscillator VO-3-F, replace the tube clamps to secure the tubes in place.

Caution

Do not rock or rotate a tube while removing it from a tube socket; pull it straight out.

CHAPTER 5

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

23. Shipment and Limited Storage

a. Disassembly of Equipment. Disassembly procedures for Oscillator VO-3-(*) are as follows:

(1) Disconnect the power cable from the power source.

(2) Disconnect the output cable from the output terminal board.

b. Repackaging for Shipment or Limited Storage. Repackaging the oscillator for shipment or limited storage is performed by the second echelon repairman.

24. Demolition of Materiel to Prevent Enemy Use

a. Authority for Demolition. Demolition of the equipment will be accomplished only upon the order of the commander. The destruction procedures given in b below will be used to prevent further use of the equipment.

b. Methods of Destruction. Use any of the following methods to destroy the equipment.

(1) *Smash*. Smash the controls, tubes, switches, capacitors, and transformers; use sledges, axes, handaxes, pickaxes, hammers, or crowbars.

(2) *Cut*. Cut the power cable and output cable; use axes, handaxes, or machetes.

(3) *Burn*. Burn cables and technical manuals; use gasoline, kerosene, oil, flame throwers, or incendiary grenades.

(4) *Bend*. Bend the dust cover and chassis.

(5) *Explode*. If explosives are necessary, use firearms, grenades, or TNT.

(6) *Dispose*. Bury or scatter the destroyed parts in slit trenches, foxholes, or throw them into streams.

APPENDIX

REFERENCES

The following reference is applicable to the operator of Oscillator VO-3-(*):

TM 11-2093-10 — Code Practice Equipments EE-94-F, EE-95-F, EE -96D, EE-96-E, and EE -96-F and Telegraphic Code Trainers AN/FGC -T1 and AN/FGC-T4, Operator's Manual.

[AG 413.44 (15 Aug 1958)]

By Order of *Wilber M. Brucker*, Secretary of the Army:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

Official:

HERBERT M. JONES,
Major General, United States Army,
The Adjutant General.

DISTRIBUTION:

Active Army:

CNGB (1)
ASA (2)
Technical Stf, DA (1) except CSigO (30)
Technical Stf Bd (1)
USA Arty Bd (1)
USA Armor Bd (1)
USA Inf Bd (1)
USA Air Def Bd (1)
USA Abn & Elct Bd (1)
USA Avn Bd (1)
USA Armor Bd Test Sec (1)
USA Air Def Bd Test Sec (1)
USA Arctic Test Bd (1)
USCONARC (5)
US ARADCOM (2)
US ARADCOM Rgn (2)
OS Maj Comd (5)
Log Comd (5)
MDW (1)
Armies (5)
Corps (2)
Div (2)
USATC (2)
Instl (2) except Atlanta Gen Depot (none)
Sig Sec, Gen Depots (10)
Sig Depots (17)
WRAMC (1)
AMS (1)
USA Elct PG (1)
USMA (5)
USA SpWar Cen (5)
Svc Colleges (5)
Br Svc Sch (5) except USASCS (25)
Fld Comd, AFSWP (5)
Engr Maint Cen (1)
AFIP (1)
Trans Terminal Comd (2)
OS Sup Agcy (2)
USA Sig Pub Agcy (8)
USA Sig Engr Agcy (1)
USA Comm Agcy (2)
TASSA (13), Midwestern Rgn Ofc (1)
USA Sig Eqp Spt Agcy (2)
USA White Sands Sig Agcy (13)
Yuma Test Sta (2)
Sig Fld Maint Shops (3)
Sig Lab (5)
Mil Dist (1)
USA Corps (Res) (1)
Sectors, USA Corps (Res) (1)
JBUSMC (2)
Units org under fol TOE:
11-7 (2)
11-15 (2)
11-16 (2)
11-17 (2)
11-57 (2)
11-127 (2)
11-128 (2)
11-500 (AA-AE) (2)
11-537 (2)
11-557 (2)
11-587 (2)
11-592 (2)
11-597 (2)
20-300 (2)
32-51 (2)
32-55 (2)
32-56 (2)
32-500 (2)

NG: State AG (6); units-same as Active Army except allowance is one copy to each unit.
USAR: None.
For explanation of abbreviations used, see AR 320-50.

☆U.S. GOVERNMENT PRINTING OFFICE : 1983 O - 381-302 (2860)

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

SOMETHING WRONG WITH PUBLICATION

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE

BE EXACT PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT.

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER	SIGN HERE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

PIN: 011129-000